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Effects of Mineral Status in the Soil, Forage, Water, Blood, Milk, Urine and Faeces on Milk Production of Lactating, Free-ranging Camels in Northern Kenya

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Abstract

Mineral status of free ranging camels in Northern Kenya is not well documented, and neither are its effects on camel milk yields. To establish the relationship between the mineral status and milk yield in free ranging camels, soil, forage, water, lactating camel blood, milk, urine and faecal samples were collected over two dry and wet seasons in Laikipia and Isiolo districts of Northern Kenya to assess Ca, P, Mg, Cu and Co status; daily milk yields were measured simultaneously.

The mean daily milk yield in Laikipia camels ($3.1 \text{ l}\cdot\text{d}^{-1}$) was significantly ($p < 0.05$) higher than that of Isiolo ($2.3 \text{ l}\cdot\text{d}^{-1}$). The wet season had higher milk yield ($2.8 \text{ l}\cdot\text{d}^{-1}$) than the dry seasons ($2.7 \text{ l}\cdot\text{d}^{-1}$). Blood mineral concentrations were significantly related with milk mineral compositions ($p < 0.05$) except for Mg. There was a significant ($p < 0.05$) positive correlation between Cu ($r = 0.753$) and Co ($r = 0.552$) status and milk yield. Milk samples from Laikipia also had significantly more ($p < 0.05$) more Co ($0.10 \text{ mg}\cdot\text{kg}^{-1}$) compared to samples from Isiolo ($0.07 \text{ mg}\cdot\text{kg}^{-1}$). However, increase in soil, water and forage Ca and Mg seemed to depress milk yield. Serum Ca and Co was statistically higher ($p < 0.05$) in Laikipia (243.5 and $0.22 \text{ mg}\cdot\text{kg}^{-1}$) than Isiolo (116.3 and $0.11 \text{ mg}\cdot\text{kg}^{-1}$; Ca and Co respectively). Mean soil and water Ca and serum P were significantly higher ($p < 0.05$) during the dry season ($192.9 \text{ mg}\cdot\text{kg}^{-1}$) than the wet season.

Milk yields seem to have been influenced by the levels of serum Cu and Co or the milk demand of Ca and Co. The mean forage and blood P, Cu and Co in both seasons were below the recommended critical levels while Ca and Mg levels are much higher. High levels of Mg may be antagonizing other minerals necessary for milk production. Seasonal variation in milk may have been due to variations in forage availability and/or mineral availability.

Keywords: Camel, milk yield, mineral status, Northern Kenya